Issued January 13, 1908.

U. S. DEPARTMENT OF AGRICULTURE,

FOREST SERVICE—Circular 137.

GIFFORD PINCHOT, Forester.

(IN COOPERATION WITH THE DEPARTMENT OF COMMERCE AND LABOR, BUREAU OF THE CENSUS, S. N. D. NORTH, DIRECTOR.)

CONSUMPTION OF POLES IN 1906.

18558—Cir. 137—08

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1908

Previous to 1905, statistics upon the production of lumber and timber products were collected by the Bureau of the Census in connection with the decennial and quinquennial censuses of manufactures. To satisfy the urgent demand for more frequent reports upon these important products, the Forest Service collected statistics of the production in 1905. In order to avoid duplication of work and to insure uniformity of results, the Bureau of the Census and the Forest Service arranged in 1906 to cooperate in the preparation of annual statistics of forest products.

The collection and compilation of the statistics of production in 1906, therefore, have been under the direct supervision of W. M. Steuart, Chief Statistician for Manufactures, and J. E. Whelchel, Expert Chief of Division, on the part of the Bureau of Census, and R. S. Kellogg, Chief of the Office of Wood Utilization, and H. M. Hale, Forest Assistant, on the part of the Forest Service.

CONSUMPTION OF POLES IN 1906.

The information in this circular concerning the consumption of poles during 1906 is based upon the number of poles purchased rather than the actual number produced during the year. It seems safe to assume, however, that the two were practically identical. Inquiries were sent out to more than 6,000 companies operating telegraph and telephone lines, electric light and power systems, trolley and street railway lines, and to railroad companies which operate their own telegraph or telephone lines. Practically all replied. The number of poles purchased during the year, as shown by these statistics, was 3,574,666, valued at $9,471,171 at the point of purchase. These figures do not include poles less than 20 feet long. Shorter poles are used for local lines and for temporary work, but they constitute only a small percentage of the total.

WOODS USED.

Table 1 shows, by kinds of woods, the quantity and value of round and sawed poles purchased in 1906. In both classes cedar ranks first and chestnut second. These two together furnish nearly nine-tenths of all the poles used, cedar supplying about three-fifths and chestnut over one-fourth.

TABLE 1.—*Number and value of round and sawed poles purchased in 1906.*

Kind.	Total.			Round poles.			Sawed poles.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*	*Number*	*Dollars.*	*Dollars.*
Cedar	2,174,279	5,579,891	2.57	2,169,869	5,571,312	2.57	4,410	8,579	1.95
Chestnut	988,084	2,625,568	2.66	987,303	2,619,314	2.65	781	6,254	8.00
Pine	177,809	686,803	3.86	162,601	590,736	3.63	15,208	96,067	6.32
Cypress	111,657	256,950	2.30	111,292	255,867	2.30	365	1,083	2.97
Juniper	57,064	163,437	2.86	57,064	163,437	2.86	.....	.....	.....
Redwood	24,760	87,189	3.56	480	3,253	6.78	24,280	83,936	3.46
Oak	9,924	13,951	1.41	8,624	10,831	1.26	1,300	3,120	2.40
Fir	9,601	21,637	2.25	8,741	19,915	2.28	860	1,722	2.00
All other	21,488	35,745	1.68	20,901	35,025	1.68	587	720	1.23
Total	3,574,666	9,471,171	2.65	3,526,875	9,269,690	2.63	47,791	201,481	4.22

In average value per pole at the point of purchase, pine stands highest. This is due not to greater intrinsic value of the wood, but

to the greater proportion of large pine poles as compared with other kinds. Oak shows the lowest average value. The average price per pole for all kinds of timber in the United States was $2.65. Round poles brought an average of $2.63 and sawed poles $4.22 each. The higher cost of the sawed product is due chiefly to the additional labor and material necessary in their manufacture.

Cedar and chestnut are the principal trees cut for round poles; pine and redwood the chief ones sawed. Redwood is seldom found small enough to use for round poles. The sapwood of pine decays rapidly; consequently a sawed pine pole from which the sapwood has been removed will last longer than a round one. The average per pole values of the different kinds of wood are interesting in a general way, but can not be used for exact comparisons because the different sizes of poles are not distinguished. The explanation for the apparently unreasonable discrepancy between the values of round and sawed cedar poles is found in the fact that all the sawed cedar poles are of small sizes.

SIZES USED.

Table 2 shows the quantity and value of the different kinds of poles, classified by length. It was found impracticable to attempt a classification by both length and top diameter, because complicated tables would have resulted. The first class covers all poles from 20 to 25 feet long, inclusive; the second those from 26 to 30, inclusive; the third those from 31 to 35, and so on. The last class presented embraces all poles 41 feet or more in length.

TABLE 2.—*Length of poles purchased in 1906.*

CEDAR.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number.	Value at point of purchase.	Average value.
Feet.						
25	1,305,148	$1,558,025	$1.19	3,616	$5,387	$1.49
30	408,139	1,316,049	3.22	686	2,296	3.35
35	262,739	1,296,874	4.94	77	589	7.65
40	123,391	760,960	6.17	31	307	9.90
45	70,452	639,404	9.08	.....	.....	.....
Total	2,169,869	5,571,312	2.57	4,410	8,579	1.95

CHESTNUT.

25	404,877	$575,436	$1.42	3	$14	$4.67
30	265,315	668,602	2.52	339	2,025	5.97
35	184,028	616,277	3.35	155	890	5.74
40	75,108	348,684	4.64	135	969	7.18
45	57,975	410,315	7.08	149	2,356	15.81
Total	987,303	2,619,314	2.65	781	6,254	8.01

TABLE 2.—*Length of poles purchased in 1906*—Continued.

CYPRESS.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number.	Value at point of purchase.	Average value.
Feet.						
25	27,041	$29,554	$1.09	97	$254	$2.62
30	40,263	49,929	1.24	258	799	3.10
35	22,700	68,934	3.04	3	9	3.00
40	14,101	62,346	4.42	5	14	2.80
45	7,187	45,104	6.28	2	7	3.50
Total	111,292	255,867	2.30	365	1,083	2.97

JUNIPER.

25	24,063	$39,025	$1.62			
30	12,003	32,421	2.70			
35	10,638	39,182	3.68			
40	4,113	16,804	4.09			
45	6,247	36,005	5.76			
Total	57,064	163,437	2.86			

PINE.

25	77,730	$130,702	$1.68	4,650	$13,127	$2.82
30	30,520	96,907	3.18	4,496	29,826	6.63
35	25,914	125,396	4.84	4,547	32,959	7.23
40	15,828	81,205	5.13	964	9,208	9.55
45	12,609	156,526	12.41	551	10,947	19.87
Total	162,601	590,736	3.63	15,208	96,067	6.32

OAK.

25	7,748	$8,995	$1.16	1,300	$3,120	$2.40
30	807	1,701	2.11			
35	35	52	1.49			
40						
45	34	83	2.44			
Total	8,624	10,831	1.26	1,300	3,120	2.40

FIR.

25	1,418	$2,118	$1.49	800	$1,610	$2.01
30	5,502	12,716	2.31	30	52	1.73
35	1,552	4,228	2.72	30	60	2.00
40	194	553	2.85			
45	75	300	4.00			
Total	8,741	19,915	2.28	860	1,722	2.00

REDWOOD.

25				19,181	$52,514	$2.74
30	470	$3,145	$6.69	4,431	24,410	5.51
35				179	1,668	9.32
40	6	66	11.00	350	3,646	10.42
45	4	42	10.50	139	1,698	12.22
Total	480	3,253	6.78	24,280	83,936	3.46

TABLE 2.—*Length of poles purchased in 1906*—Continued.

ALL OTHER.

Length.	Round.			Sawed.		
	Number.	Value at point of purchase.	Average value.	Number	Value at point of purchase.	Average value.
Feet.						
25	14,369	$17,923	$1.25	511	$384	$0.75
30	3,454	7,967	2.31	33	102	3.09
35	1,913	3,487	1.82	43	234	5.44
40	843	3,394	4.03	.....	.....	.....
45	322	2,254	7.00	.....	.....	.....
Total	20,901	35,025	1.68	587	720	1.23

TOTAL.

25	1,862,394	$2,361,778	$1.27	30,158	$76,410	$2.53
30	766,473	2,189,437	2.86	10,273	59,510	5.79
35	509,519	2,154,430	4.23	5,034	36,409	7.23
40	233,584	1,274,012	5.45	1,485	14,144	9.52
45	154,905	1,290,033	8.33	841	15,008	17.85
Total	3,526,875	9,269,690	2.69	47,791	201,481	4.22

The shortest or 25-foot class takes in three-fourths of the redwood poles, three-fifths of the cedar, one-half of the chestnut, and two-fifths of the juniper. With cypress the quantities are more evenly distributed among the 25, 30, and 35 foot sizes.

The price of the poles at the point of purchase is the basis on which their value was determined. In theory this price might be supposed to represent the spot value of the poles at the nearest point of shipment. In practice, however, this is not always the case. For example, one consumer may purchase directly from the producer, and the cost of poles at the point of purchase is then the spot value, while another company operating in the same territory as the first may deal with a local middleman, in which case the cost at the point of purchase includes transportation charges. This condition is, at least partly, the cause of the differences between the values per pole of different woods in the same size class as shown in Table 2. The smallest size class of cedar pole, for example, shows a lower average value than the corresponding pine and chestnut poles—that is, cedar poles are oftener purchased at the point of production than are pine or chestnut. There is a possibility also that within this class size there are more short cedar poles than is the case with the other woods.

NUMBER OF POLES USED BY VARIOUS KINDS OF ELECTRICAL COMPANIES.

Table 3 shows the kind, quantity, and value of the poles bought by the four principal classes of consumers—telegraph and telephone companies, steam railroad companies, street railway companies, and electric light and power companies. The street railways are grouped

with the electric light and power companies, because not infrequently one company serves in a double capacity and separation was impossible.

TABLE 3.—*Poles purchased by various classes of consumers in 1906.*

Kind.	Total.			Telephone and telegraph companies.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*
Cedar	2,174,279	5,579,891	2.57	1,532,906	3,079,852	2.01
Chestnut	988,084	2,625,568	2.66	661,898	1,510,484	2.28
Cypress	111,657	256,950	2.30	21,395	36,559	1.71
Juniper	57,064	168,437	2.86	38,331	91,854	2.40
Pine	177,809	686,803	3.86	121,609	478,427	3.93
Oak	9,924	13,951	1.41	2,980	1,500	.50
Fir	9,601	21,637	2.25	9	94	10.44
Redwood	24,760	87,189	3.56	7,140	24,390	3.42
All other	21,488	35,745	1.68	9,454	11,789	1.25
Total	3,574,666	9,471,171	2.65	2,395,722	5,234,949	2.19

Kind.	Steam railroad companies.			Street railroads, electric light and power companies.		
	Quantity.	Value at point of purchase.	Average value per pole.	Quantity.	Value at point of purchase.	Average value per pole.
	Number.	*Dollars.*	*Dollars.*	*Number.*	*Dollars.*	*Dollars.*
Cedar	144,359	371,246	2.57	497,014	2,128,793	4.28
Chestnut	63,151	139,579	2.21	263,035	975,505	3.71
Cypress	11,976	20,271	1.69	78,286	200,120	2.56
Juniper	465	638	1.37	18,268	70,945	3.88
Pine	16,826	22,866	1.36	39,374	185,510	4.71
Oak	2,736	2,549	.92	4,208	9,902	2.35
Fir	1,284	2,533	1.97	8,308	19,010	2.29
Redwood	9,871	21,920	2.22	7,749	40,879	5.28
All other	3,600	4,225	1.17	8,434	19,731	2.34
Total	254,268	585,827	2.30	924,676	3,650,395	3.95

The telegraph and telephone companies purchased about two-thirds of the total number reported and the street railway, light, and power companies about one-fourth. The remainder is credited to railroad companies which own and operate their own telegraph or telephone lines.

SUPPLY.

The regions of supply of the two principal pole timbers—cedar and chestnut—are fairly well defined and are, unfortunately, extremely limited. The present source of supply of cedar poles in the United States is confined almost entirely to the Lake States. The total purchase of cedar poles reported for the United States in 1906 was 2,174,279. The production of the Northwestern Cedarman's Association, which operates in the Lake States, as shown by the association statistics, was more than 1,700,000. The greater part of the produc-

tion outside the Lake States can be credited to two sources—Maine and the adjoining States, including the Adirondacks in New York, and the Idaho cedar territory. From these districts cedar poles are shipped to practically every State in the Union.

The regions from which the supply of chestnut poles is drawn are even narrower. A small territory—embracing parts of Pennsylvania, Maryland, Virginia, and West Virginia—furnishes nearly all of these poles. Cypress poles necessarily come from the South, probably the greater part from the Gulf States; juniper, from Virginia, the Carolinas, and other South Atlantic States. Redwood comes wholly from California.

With the regions of supply so restricted, transportation becomes an important factor. The cost of the pole is sometimes doubled by freight charges. This difficulty is obviated, in a measure, by the use of local woods, cypress and pine in the Southern States, for instance, and chestnut and juniper in the Atlantic States. On the Pacific coast cedar is supplemented to a considerable extent by pine and redwood. But such local supplies are insufficient, and cedar and pine are found everywhere.

There are no data available which show even approximately the quantity of cedar still standing in this country or Canada to meet the enormous demand of 2,000,000 poles each year. It is certain, however, that when the present supply is exhausted it will be gone forever, since the cedar, though it reproduces fairly well, grows so slowly that other kinds of trees, chestnut for instance, will be more profitable to produce by systematic management.

SUITABILITY OF VARIOUS WOODS.

There are several qualities which timber must possess to adapt it to use for poles. The most important of these are: Durability in contact with the soil, minimum weight, straightness coupled with relatively small size, and little taper. The wood must be soft, so that the spikes of a climber may enter readily, and at the same time it must have strength to support considerable weight. These qualities are admirably combined in cedar and in juniper, which commercially is a cedar. No other woods possess so many.

Chestnut and cypress are both durable; chestnut is not so straight as cedar and is liable to be knotty. The wood, though soft, is not as soft as cedar. It has greater strength, but this advantage is more than counterbalanced by its greater weight, which prohibits long shipments. Cypress frequently is too large for use as a pole and has greater value for lumber. Even when its general diameter is small enough the butt will often be so big that it adds too much weight. Pine, besides being heavier than cedar, is so much less durable that

it can not compete as a pole wood without preservative treatment. Redwood possesses durability, lightness, and softness, but its size necessitates sawing, which adds to the cost.

PRESERVATIVE TREATMENT.

One of the results of the increased cost of poles and the difficulty of obtaining a sufficient quantity of satisfactory stock has been an effort to increase the period of service of poles by preservatives, generally by applying a liquid to the whole of the pole or, more generally, to the butt, which is most liable to decay. Poles which have not been treated with preservatives may be expected to give from ten to fifteen years of service, roughly speaking.

Creosote is probably more extensively used than any other preservative, though ordinary paint is a common agent. For the butt tar is often employed, and charring by fire is found useful. The American Telephone and Telegraph Company is carrying on extensive experiments in cooperation with the Forest Service to determine the best methods and materials. Several experimental lines of variously treated poles have been erected and careful records of the behavior of each pole is being kept. By the comparatively new open-tank treatment the preservative is forced into the wood of the butt by a much simpler and more inexpensive method than was formerly used.[a]

Successful preservatives make possible the use for poles of a great number of otherwise unsuitable timbers, many of them among the cheaper and more abundant woods.

Approved.

JAMES WILSON,

Secretary.

WASHINGTON, D. C., *November 16, 1907.*

---

[a] Forest Service Circular 104: Brush and Tank Pole Treatments.

O